



## Supplementary Materials for

### **Protecting unauthorized immigrant mothers improves their children's mental health**

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## **Materials and Methods**

### **Data**

We obtained data through the Department of Health Analytics at the Oregon Health Authority. Medical claims data are for all Medicaid claims for the sample period from January 1, 2003 to October 1, 2015. This data includes claims and beneficiary information from all pregnancies under Emergency Medicaid and standard Medicaid, as well as claims and beneficiary data for children using standard Medicaid. Since US-born children of unauthorized immigrants are US citizens, they are eligible for full-scope Medicaid benefits, and their eligibility is not affected by changes in their parent's immigration status. Emergency Medicaid in Oregon covers emergencies and obstetrics for non-citizens through the CAWEM (Citizen/Alien Waived Emergent Medical Care) and the CAWEM Prenatal Program. Statistics from North Carolina showed that more than 80% of spending on Emergency Medicaid was related to childbirth and complications of pregnancy (25).

From this claims data we identified women of reproductive age (12-51) and their offspring born during the sample period. We employed a matching algorithm that utilized a validated household identification number in the beneficiary file and other auxiliary information to match pregnancies and infants. Below we describe the details of the matching. Unfortunately it is not possible to link fathers in the same way, since only mothers have a claim that coincides with the date of the child's birth.

Using this matched sample we then trimmed the data to the 8,610 children who were born during the sample period to the 5,653 mothers who (1) utilized Emergency Medicaid for the pregnancy and (2) had birthdates between January 1, 1980 and December 31, 1982. Hence, the sample is restricted to children whose mothers are at most 18 months older or younger (approximately) than the June 15, 1981 DACA age eligibility cutoff. We refer to this sample as

the children of unauthorized mothers. This is based on the assumption that the large majority of women who utilize Emergency Medicaid for delivery are unauthorized immigrants. In order to be eligible to use Emergency Medicaid women had to be (1) poor enough to meet the Medicaid income requirements and (2) either have an unauthorized immigration status or be a long-term permanent resident still under the 5-year waiting period to qualify for Medicaid. Data from California and North Carolina suggests that 91% and 99% of the Emergency Medicaid users in those states are unauthorized immigrants, respectively (25, 26). Note that to the extent that the Emergency Medicaid users also include some fraction of immigrant mothers who are not unauthorized, we will underestimate the treatment effect because such mothers are not affected by DACA. Note that all children in our sample are born in Oregon and therefore US citizens by birth.

As an additional check we also constructed a parallel sample of 26,967 children who were born during the sample period to mothers who (1) utilized standard medicaid for the pregnancy and (2) had birthdates between between January 1, 1980 and December 31, 1982. We refer to this sample as the children of Medicaid mothers. Since unauthorized immigrants are not eligible for standard Medicaid, mothers and children in this second sample should not be affected by DACA.

### **Matching Women and Infants**

To match pregnancies and infants in the claims data we used the following procedure:

1. We identified pregnancy outcomes that would have resulted in a live birth among women in the claims data aged 12-51.
2. We identified claimants aged 0 in the claims database.
3. We used three variables to find a first set of matches: scrambled Household ID, the date

of the birth based on the delivery claim, and the infant's date of birth. For this first set of matches the date of birth of the infant had to be equal to the date of the delivery claim. If no match is found we proceed and look for a match one or two days following the delivery date. We focus on this window to account for the fact that the delivery service can start up to two days before the birth. 75% of of the final matches were from this first set.

4. For the pregnancies that remained unmatched, we searched for a matching infant based on the date of the delivery, the infant's date of birth, enrollment zip code of the claimants (mother and infant), service zip codes of the claimants (mother and infant), race and ethnicity of the claimants (mother and infant). For this second set of matches the date of birth of the infant again had be equal to the delivery date or up to 2 days later. 25% of the final matches were from this second set.

5. We dropped multiple merges and multiple births from the matched data.

The final match rate was 79% overall. It was 85% for pregnancies under Emergency Medicaid (CAWEM), 83% for pregnancies under Emergency Medicaid Plus Prenatal (CAWEM Prenatal Program), and 77% for pregnancies under standard Medicaid. The match rate was fairly stable over the years with a minimum match rate of 76%, a maximum match rate of 82%, and a standard deviation of the match rate across the years of 2%. The temporal stability pattern was roughly similar for all three insurance groups. The code for the matching available in the DACA replication code archive at <http://dx.doi.org/10.7910/DVN/8EEDAP>.

## **Statistical Analysis**

Following our pre-registered analysis plan, we applied a regression discontinuity (RD) design (27) to identify the causal effect of the unauthorized mothers' DACA eligibility on their children's mental health outcomes. For our benchmark specification we estimated the following

standard local linear regression with varying slopes:

$$Y_{i,j} = \alpha + \beta_1 Dist_{i,j} + \tau Z_{i,j} + \beta_2 (Z_{i,j} \cdot Dist_{i,j}) + \epsilon_{i,j}$$

where  $Y_{i,j}$  is the mental health outcome for child  $i$  from mother  $j$ ;  $Dist_{i,j}$  is the so-called running variable which measures the distance (in days) between the birthdate of mother  $j$  and the DACA eligibility birthdate cutoff of June 15, 1981;  $Z_{i,j}$  is the “treatment” indicator for the mother’s DACA eligibility based on her birthdate;  $\alpha$ ,  $\beta_1$ ,  $\beta_2$ , and  $\tau$  are regression coefficients; and  $\epsilon_{i,j}$  is the error term.

Note that the distance variable  $Dist_{i,j}$  is positive (negative) for mothers who were born after (before) the June 15, 1981 cutoff date and therefore eligible (ineligible) for DACA based on the age criteria;  $Dist_{i,j}$  is equal to zero for mothers who were born on the cutoff date. The treatment indicator is coded as  $Z_{i,j} = 1[Dist_{i,j} > 0]$  such that  $Z_{i,j}$  is equal to one for mothers who were born after the cutoff date and therefore eligible for DACA and  $Z_{i,j}$  is equal to zero for mothers who were born before (or on) the cutoff date and therefore ineligible for DACA. In this regression equation the central quantity of interest is the coefficient  $\tau$  that identifies the effect of the mother’s DACA eligibility on child outcomes by capturing a potential jump in the conditional expectation function at the birthdate cutoff. Note that  $\tau$  measures the intention-to-treat effect of mothers’ DACA eligibility, since we do not know if all mothers in our sample who are born after the cutoff date fulfilled the other DACA eligibility criteria and eventually applied for and received DACA. Some fraction of mothers might also be low-income lawful permanent residents with less than five years of residency and therefore not affected by DACA. Note that such “non-compliance” arising from mothers who are born after the cutoff birthdate, but still not eligible, can result in an underestimate of the effect of DACA eligibility in our regressions. The same is true for “non-compliance” arising from mothers who were born before the cutoff birthdate but somehow still obtain DACA by successfully falsifying their birthdates

in the DACA application forms. Also note that the effect estimate is local in the sense that it identifies the effect at the birthday cutoff.

As is common in RD analysis (27), we restricted the estimation sample to children of mothers whose birthdates fall within a certain window around the birthdate cutoff. To avoid cherry-picking a specific bandwidth for our benchmark specification we employed the adaptive bandwidth selection algorithm proposed in (38) to determine the MSE-optimal symmetric bandwidth for each outcome variable. The optimal bandwidths were determined as 199 days for the Adjustment or Anxiety Disorder outcome, 180 days for the Adjustment Disorder outcome, and 132 days for the Anxiety Disorder outcome. We then fitted the local linear regressions to the restricted samples of mothers whose birthdates were within the optimal bandwidth distances from the threshold, but also examined the sensitivity of the results when varying the bandwidth. We cluster the standard errors by the mother in all specifications to account for the potential non-independence of outcomes from children who have the same mother.

The key identification assumption in the RD design is that the potential outcomes are continuous around the birthdate cutoff that determined DACA eligibility (27). This assumption is plausible because unauthorized mothers' birthdates pre-date the announcement of the policy by more than 30 years. Moreover, mothers had no incentives to sort around the cutoff date by manipulating their birthdates in the historical medical records since they were not aware of the policy cutoff date before DACA was implemented. Therefore, in the neighborhood of the June 15, 1981 birthdate cutoff, mothers' DACA eligibility was as good as randomly assigned. Children of mothers who were born just before the birthdate cutoff (i.e., not eligible for DACA) should in expectation be similar in all observed and unobserved confounding characteristics to children of mothers who were born just after the birthdate cutoff.

The balance checks presented in the lower right panel of Figure 1 corroborated the validity of the identification assumption, as covariates from mothers and children were well-balanced

at the birthdate cutoff. Moreover, the tests for sorting around the birthdate cutoff presented in Figure S.2 also corroborated the validity of the identification assumption, since there was no break in the frequency of observations around the cutoff, indicating that there was no evidence of manipulation.

## **Outcomes**

We used the following prespecified outcome variables in the analysis:

- *Adjustment or Anxiety Disorder*: Coded as 1 if a child had any diagnoses with International Classification of Diseases - 9 (ICD-9) category codes 309 (Adjustment reaction), 308 (Acute reaction to stress), or 300 (Anxiety disorder) during the period, and zero otherwise. The three major categories were chosen because they capture important mental illnesses that can arise in reaction to external stressors (as compared to mental illnesses where the reasons are primarily genetic, physiological, or unknown) and are clinically relevant for children in our age range (32, 36, 40). Table S.1 provides descriptive statistics for the percent of children who had at least one diagnosis in the 300, 308, and 309 diagnosis categories. Table S.2 provides a list of all observed subcategories included under the 300, 308, and 309 categories as well as descriptive statistics for the percentage of children who had at least one diagnosis in each subcategory. Note that one visit can include multiple diagnoses, and one observed diagnosis of adjustment disorder (309), can include multiple subcategories. Recall that DACA was announced on June 15, 2012, but there were few applications approved until 2013 (see Figure S.1). For the post-DACA period we therefore searched for diagnoses over the 2013-2015 period, and for the pre-DACA period we searched over the 2003-2012 period, including the first two quarters of 2012. We used the same definition of post-DACA and pre-DACA period for all outcomes. Below we also examined the sensitivity of the results to re-defining the post-DACA period



to include quarters 3 and 4 of 2012 (see Figure S.7).

- *Adjustment Disorder*: Coded as 1 if a child had any diagnoses with ICD-9-CM category code 309 (Adjustment reaction) or 308 (Acute reaction to stress), and zero otherwise. Acute stress can be a precursor to a diagnosis of a more lasting adjustment disorder. Note that the 309 and 308 codes are particularly relevant for our study because they capture mental illnesses where the emotional or behavioral symptoms are in response to an identifiable external stressor. We combined 309 and 308 because 308 had a relatively small number of diagnoses so we could not examine it in isolation.
- *Anxiety Disorder*: Coded as 1 if a child had any diagnoses with ICD-9-CM category code 300 (Anxiety disorder). These disorders form a more heterogeneous category, as some types can be caused by environmental factors (even though the external stressor might not be clearly identified), while other types are often caused by genetic or physiological factors (32, 36).
- *Number of Visits*: Measures the number of health care visits that a child had during the period of interest. A visit was defined as having at least one diagnosis or procedure claim on a distinct day of service such that visits with multiple claims only get counted as a single visit. For total visits we included all claims to any type of facility. This outcome was not prespecified.
- *Number of Emergency Room and Urgent Care Visits*: Measures the number of emergency room and urgent care visits a child had during the period of interest. A visit was defined as having at least one diagnosis or procedure claim on a distinct day of service such that visits with multiple claims only get counted as a single visit. We identified emergency room and urgent care visits based on the type of facility recorded in the place of service field in the claims file.

- *Number of Outpatient Visits*: Measures the number of outpatient visits a child had during the period of interest. A visit was defined as having at least one diagnosis or procedure claim on a distinct day of service such that visits with multiple claims only get counted as a single visit. We identified outpatient visits based on the type of facility recorded in the place of service field in the claims file.

## **Descriptive Statistics**

Figure S.1 shows the cumulative number of DACA applications approved by the United States Citizenship and Immigration Service (USCIS) since the program began in 2012. Few applications were processed and approved in 2012. In 2013 there was a rapid increase in the number of approved applications, and this increase gradually slowed down in the following years.

Table S.1 provides descriptive statistics for the sample of children of unauthorized mothers. About 49% of the children were female, and 73% were of Hispanic ethnicity. The average age at the end of the sample period was 6.8 years, with a standard deviation of 3.4 years (the age range was from 0-12 years). 5% of the children had an adjustment or anxiety disorder diagnosis in the post-DACA period, and almost the same fraction had an adjustment or anxiety disorder diagnosis in the pre-DACA period.

Table S.2 provides a breakdown of the descriptive statistics for the mental health disorders, showing the percentage of children in our sample who had at least one diagnosis in any subcategory or subclassification of the 300, 308, and 309 codes in the post-DACA period. Note that a child might have had diagnoses in multiple subcategories or subclassifications.

## Supplementary Text

### Tests for Covariate Imbalance at the Birthdate Cutoff

In order to check the balance of the covariates, we examined if they had discontinuities at the birthdate cutoff by fitting the benchmark RD local linear regression and using the background characteristics as outcomes. The lower right panel of Figure 1 show the p-values, and the regression results are displayed in Tables S.3 and S.4. The results corroborated the validity of the RD identification assumption, as covariates from mothers and children were well balanced at the birthdate cutoff, suggesting that observations where the mother just missed or met the birthdate cutoff were similar in all observed confounding characteristics in expectation. The distribution of p-values approximated the uniform distribution one would expect for balance checks in a randomized experiment.

### Tests for Sorting Around the Birthdate Cutoff

To check for manipulation of the birthdates, we implemented the test developed by (43) to examine if there was a break in the frequencies of birthdates around the eligibility cutoff. If mothers could sort around the birthdate cutoff to manipulate their DACA eligibility we might expect an unusually low number of birthdates just before June 15th, 1981, and an unusually high number of birthdates right after June 15th, 1981.

Figure S.2 shows that—in support of the no sorting assumption—there was no discernible discontinuity in the density of the birthdates of the mothers in the sample around the June 15th, 1981, birthdate cutoff that determined DACA eligibility. The estimate for the break in the density was close to zero and insignificant (p-value = 0.175). In addition, we replicated the result using a recently developed sorting test by (44) and it yielded the same conclusion, with an estimate for the break in the density that was close to zero and insignificant (p-value = 0.906). Taken together these tests corroborated the no sorting assumption.

## **Effect of Mothers' DACA Eligibility on their Children's Mental Health**

Table S.5 shows the regression estimates for the effects of mothers' DACA eligibility on all three mental health outcomes as shown in the left panel of Figure 2. The estimates are from the local linear regression at the MSE optimal bandwidth as described in the methods and material section (the benchmark model). We see that mothers' DACA eligibility reduced adjustment and anxiety disorder by 4.3 percentage points (Model 1) and adjustment disorder by 4.4 percentage points (Model 2). The effect is insignificant for anxiety disorders only (Model 3).

As shown in the last row of Table S.5, the effects on adjustment/anxiety disorder and adjustment disorder corresponded to more than a 50 percent drop compared to the average rate of diagnoses among children of ineligible mothers right at the birthdate cutoff, but note that the wide confidence intervals suggested a wide range of potential effect magnitudes. The percent reduction was computed as  $100 \left( \frac{\hat{\tau}}{\hat{\alpha}} \right)$ , where  $\hat{\tau}$  was the estimated coefficient on the DACA eligibility indicator that measured the intention-to-treat effect at the cutoff, and  $\hat{\alpha}$  was the estimated intercept that measured the average rate of the diagnoses at  $Dist_{ij} = 0$ , i.e. among children of ineligible mothers right at the birthdate cutoff. Figure S.3 shows the RD plots for a bandwidth of 150 days for all three outcomes.

Table S.6 (the right panel of Figure 2) shows the regression estimates for the effects of mothers' DACA eligibility on all three mental health outcomes in the pre-DACA period. As expected, there were no statistically significant differences before DACA was implemented.

## **Sensitivity of Estimates to Bandwidth**

We replicated the benchmark RD model for children's mental health outcomes in the post-DACA period, and varied the bandwidths to examine the sensitivity of the effect estimates. Figure S.4 shows that the effect estimates were stable when we varied the bandwidths around the optimal bandwidths.

### **Replication with Alternative Estimator**

We replicated the RD effects using the bias-corrected local polynomial estimator developed by (38), again using clustered standard errors and the estimation samples that are trimmed to the optimal bandwidths. Figure S.5 and Table S.7 shows that the results from this alternative estimator were similar to those from the benchmark model.

### **Excluding Children Born After DACA**

It is possible that receiving DACA affected mothers' decision to have a child. We replicated the benchmark RD model and found that the effects of mothers' DACA eligibility were similar when we excluded from the sample children who were born in the post-DACA period. The estimates are shown in Table S.8 and Figure S.6.

### **Including Quarters 3 and 4 of 2012 in Post-DACA Period**

Recall that in the main models we defined the post-DACA period as the years 2013-2015 since DACA was announced on June 15, 2012, but few applications were approved until 2013. We examined whether the results changed when we redefined the post-DACA period to include quarters 3 and 4 of 2012. Replicating the benchmark RD model we found that the effects of mothers' DACA eligibility were similar when we redefined the post-DACA period in this way. The estimates are shown in Table S.9 and Figure S.7.

### **Alternative Definition of Mental Health Outcomes**

We examined whether the results were sensitive to the precise definition of the mental health outcomes. In particular, we replicated the results using an alternative coding of the mental health outcomes based on the Diagnostic and Statistical Manual of Mental Disorders (version 5). For this alternative coding we followed the Manual and defined Adjustment Disorder as all

diagnoses in the ICD-9 subcategories 309.00, 309.3, 309.4, 309.24, 309.28, and 309.9, Acute stress disorder as all diagnoses in the ICD-9 subcategories 308.3 and 309.81, and Anxiety disorder as all diagnoses in the ICD-9 subcategories 309.21, 300.02, 313.23, 300.01, 300.29, 293.84, 300.23, 300.09, 300.00, and 300.22. Table S.10 and Figure S.8 show that the results are similar to those from the benchmark model. This test was not prespecified.

### **Effect of Mothers' DACA Eligibility by Child Age**

We examined whether the effect of Mothers' DACA Eligibility on their children's mental health varied by the age of the child, based on the idea that older children might have been more aware of the change in their mothers' unauthorized status, and thereby more affected by the related stress and fears of deportation. To test for this we split the sample into two roughly equal sized groups of children ages 0-5 and 6-12 (in 2015) and estimated the benchmark RD model for both samples. Figure S.9 and Tables S.11 and S.12 show that the effect was concentrated among the older children, while there was no significant effect for the younger children. This test was not prespecified.

### **Effect of Mothers' DACA Eligibility by Child Gender**

We examined whether the effect of mothers' DACA eligibility on their children's mental health varied by the gender of the child. To test for this we split the sample into males and females and estimated the benchmark RD model for both samples. Figure S.10 and Tables S.13 and S.14 show that the effect on adjustment disorder was slightly more pronounced among male children but the effect was not statistically significantly different from the effect for females ( $p$ -value=0.209). This test was not prespecified.

## **Effect of Medicaid Mothers' Birthdates on Children's Mental Health**

We replicated the benchmark RD model using the sample of children belonging to the Medicaid mothers as an extra check. These children should not be affected by whether their mothers' birthdates were before or after the DACA eligibility cutoff, because unauthorized mothers were not eligible for Medicaid. The treatment indicator in this regression mirrored the coding in the sample of children of unauthorized mothers, such that it was one for mothers who were born after the June 15th, 1981 birthdate cutoff, and zero for mothers born before the cutoff date. Figure S.11 and Table S.15 show that the effect estimates did not indicate any discernible effect of having a mother who was born before or after the cutoff date on the mental health outcomes of the children of Medicaid mothers. The results from this check ruled out the possibility that, in the absence of DACA eligibility, mothers who were born just before the cutoff date differed in potentially important unobserved characteristics from mothers who were born just after the cutoff date. In other words, the result indicated that there was nothing special about the June 15, 1981 birthdate cutoff.

## **Effect of Mother's DACA Eligibility on Children's Health Care Utilization**

It is possible that mothers who obtained DACA were more likely to take their children to the doctor, and their health care utilization would thereby increase. On the other hand, mothers' employment or income could be affected by DACA, and that could cause some children to transfer from Medicaid to private insurance. This would imply that we would not be able to observe whether these children are diagnosed with any disorder. To investigate these alternatives, we both looked at the number of health care visits, and also restricted the analysis to children with at least one health care visit in the post-DACA period. Figure S.12 and Table S.16 show the estimated effects of mothers' DACA eligibility on their children's health care utilization in the post-DACA period using the benchmark RD model. There was no discernible effect on the

health care utilization as measured either by the total number of visits (not prespecified), the number of emergency room and urgent-care visits, or the number of outpatient visits per child.

### **Restricting the Sample to Children with Health Care Visits Post-DACA**

Using the benchmark RD model we found that the effects of mothers' DACA eligibility were similar when we restricted the sample to children who had at least one health care visit in the post-DACA period. The estimates are shown in Table S.17 and Figure S.13 . This test was not prespecified. We acknowledge that visits in the post-DACA period might be affected by DACA eligibility and therefore conditioning on this variable could introduce post-treatment bias.



## Tables

Table S.1: Descriptive Statistics for Sample of Children of Unauthorized Mothers

	Mean	SD	Obs
Post-DACA Period (2013-2015):			
Adjustment or Anxiety Disorder	5.15	22.09	8610
Adjustment Disorder	4.10	19.83	8610
Anxiety Disorder	1.44	11.91	8610
No. of Total Visits	9.56	12.04	8610
No. of Outpatient Visits	8.90	11.21	8610
No. of Emergency Room and Urgent Care Visits	0.65	1.29	8610
Pre-DACA Period (2003-2012):			
Adjustment or Anxiety Disorder	5.02	21.84	7147
Adjustment Disorder	4.31	20.31	7147
Anxiety Disorder	0.83	9.05	7147
No. of Total Visits	27.98	21.40	7147
No. of Outpatient Visits	23.04	19.30	7147
No. of Emergency Room and Urgent Care Visits	1.04	1.77	7147
Time-invariant:			
Year of Birth	2008.17	3.41	8610
Month of Birth (1-12)	6.40	3.37	8610
Age in 2015	6.83	3.41	8610
Female	49.05	49.99	8610
Ethnicity:			
Hispanic	73.44	44.17	8610
Not hispanic	17.36	37.88	8610
Unkown	9.20	28.90	8610
Race:			
Other	72.64	44.58	8610
White	18.70	38.99	8610
Hispanic	4.27	20.23	8610
Asian	3.46	18.28	8610
Black	0.80	8.92	8610
American Indian	0.13	3.57	8610
Mother:			
Year of Birth	1981.02	0.82	8610
Distance of Birthday from Cutoff Date (days)	24.65	316.52	8610

Sample consists of children who are born to mothers who utilized Emergency Medicaid for delivery during the 2003-2015 period. Post-DACA period is from 2013 to 2015. Pre-DACA period is from 2003 to 2012 (including only the first two quarters of 2012). Binary variables are coded as 0 or 100 such that the summary statistics are in percentage points.

Table S.2: Diagnoses (ICD 9) in the post-DACA Period

	Mean	SD	Obs
300. Anxiety, dissociative and somatoform disorders			
300.00 Anxiety state, unspecified	0.84	9.11	8610
300.01 Panic disorder without agoraphobia	0.06	2.41	8610
300.02 Generalized anxiety disorder	0.30	5.49	8610
300.09 Other anxiety states	0.15	3.88	8610
300.11 Conversion disorder	0.00	0.00	8610
300.19 Other and unspecified factitious illness	0.01	1.08	8610
300.20 Phobia, unspecified	0.01	1.08	8610
300.21 Agoraphobia with panic disorder	0.00	0.00	8610
300.23 Social phobia	0.02	1.52	8610
300.29 Other isolated or specific phobias	0.06	2.41	8610
300.3 Obsessive-compulsive disorders	0.02	1.52	8610
300.4 Dysthymic disorder	0.17	4.17	8610
300.7 Hypochondriasis	0.01	1.08	8610
300.81 Somatization disorder	0.00	0.00	8610
300.82 Undifferentiated somatoform disorder	0.00	0.00	8610
300.9 Unspecified nonpsychotic mental disorder	0.01	1.08	8610
308. Acute Reaction to Stress			
308.0 Predominant disturbance of emotions	0.23	4.81	8610
308.1 Predominant disturbance of consciousness	0.00	0.00	8610
308.2 Predominant psychomotor disturbance	0.01	1.08	8610
308.3 Other acute reactions to stress	0.99	9.89	8610
308.4 Mixed disorders as reaction to stress	0.00	0.00	8610
308.9 Unspecified acute reaction to stress	0.20	4.44	8610
309. Adjustment Reaction			
309.0 Adjustment disorder, depressed mood	0.29	5.38	8610
309.1 Prolonged depressive reaction	0.01	1.08	8610
309.21 Separation anxiety disorder	0.13	3.57	8610
309.23 Specific academic or work inhibition	0.01	1.08	8610
309.24 Adjustment disorder, anxiety	0.45	6.72	8610
309.28 Adjustment disorder, mixed anxiety/depressed mood	0.52	7.21	8610
309.29 Other adjustment reactions, disturbance of other emotions	0.02	1.52	8610
309.3 Adjustment disorder, disturbance of conduct	0.28	5.27	8610
309.4 Adjustment disorder, mixed disturbance of emotions/conduct	0.82	9.04	8610
309.81 Posttraumatic stress disorder	0.37	6.09	8610
309.82 Adjustment reaction, physical symptoms	0.01	1.08	8610
309.89 Other specified adjustment reactions	0.01	1.08	8610
309.9 Unspecified adjustment reaction	0.37	6.09	8610

Binary variables were coded as 0 or 100 such that the summary statistics are in percentage points. The mean values refer to the share of children who were diagnosed with a specific ICD 9 code at least once during the post-DACA period. Note that one visit can include multiple diagnoses.

**Table S.3: Regression Discontinuity Design Estimates: Effects of Mothers' DACA Eligibility on Children's Pre-DACA Background Characteristics**

Outcome	No. of Outpatient Visits	No. of ER Visits	No. of Total Health Care Visits	Year of Birth	Month of Birth (1-12)	Female
Effect of Mothers'	-1.73	-0.34	-1.13	0.19	0.21	-0.44
DACA Eligibility	(1.68)	(0.19)	(1.93)	(0.27)	(0.24)	(3.58)
Observations	2249	2179	2071	2379	3210	3221
Optimal bandwidth ( $\pm$ days)	175	170	163	156	205	206

Regression coefficients from local linear regression shown with robust standard errors (clustered by mother) in parentheses. The estimation samples are determined by an adaptive mean-squared error optimal bandwidth selection. All models include the distance variable and its interaction with the DACA Eligibility indicator. The binary variables are coded as 0 or 100 such that the effect estimates of the regression coefficients are measured in percentage points. See text for details.

**Table S.4: Regression Discontinuity Design Estimates: Effects of Mothers' DACA Eligibility on Children's Pre-DACA Background Characteristics**

Outcome	Ethnicity: Not hispanic	Ethnicity: Hispanic	Ethnicity: Unknown	Race: White	Race: Asian	Race: Black	Race: Hispanic	Race: Am. Indian	Race: Other	Age in 2015
Model	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Effect of Mothers'	-2.92	-1.38	4.06	-3.70	-0.26	0.50	2.02	0.34	1.20	-0.19
DACA Eligibility	(3.71)	(4.20)	(2.20)	(4.66)	(1.66)	(0.68)	(1.59)	(0.32)	(4.85)	(0.27)
Observations	2303	2435	3260	2068	2768	2216	3039	1901	2234	2379
Optimal bandwidth ( $\pm$ days)	153	161	210	137	180	148	198	126	148	156

Regression coefficients from local linear regression shown with robust standard errors (clustered by mother) in parentheses. The estimation samples are determined by an adaptive mean-squared error optimal bandwidth selection. All models include the distance variable and its interaction with the DACA eligibility indicator. The binary variables are coded as 0 or 100 such that the effect estimates of the regression coefficients are measured in percentage points. See text for details.

**Table S.5: Regression Discontinuity Design Estimates: Effect of Mothers' DACA Eligibility on Children's Mental Health**

Outcome	Adjustment or Anxiety Disorder	Adjustment Disorder	Anxiety Disorder
Model	(1)	(2)	(3)
Effect of Mothers'	-4.27	-4.36	-1.74
DACA Eligibility	( 1.87)	( 1.75)	( 1.22)
Number of children	3039	2741	2002
Optimal bandwidth ( $\pm$ days)	199	180	132
Percent change ( $100 \left( \frac{\hat{\tau}}{\hat{\alpha}} \right)$ )	-53.99	-65.59	-71.69

Regression coefficients from local linear regression shown with robust standard errors (clustered by mother) in parentheses. The estimation samples are determined by an adaptive mean-squared error optimal bandwidth selection. All models include the distance variable and its interaction with the DACA eligibility indicator. The outcome variables are coded as 0 or 100 such that the effect estimates of the regression coefficients are measured in percentage points. The percent change in the last row is computed as  $100 \left( \frac{\hat{\tau}}{\hat{\alpha}} \right)$  and measures at the DACA birthdate cutoff the effect of mothers' DACA eligibility ( $\hat{\tau}$ ) divided by the estimated average diagnoses rate for children of ineligible mothers ( $\hat{\alpha}$ ). See text for details.

**Table S.6: Regression Discontinuity Design Estimates: Effect of Mothers' DACA Eligibility on Children's Mental Health in Pre-DACA Period**

Outcome	Adjustment or Anxiety Disorder	Adjustment Disorder	Anxiety Disorder
Model	(1)	(2)	(3)
Effect of Mothers' DACA Eligibility	0.70 ( 2.10)	0.21 ( 1.99)	0.74 ( 0.76)
Number of children	1325	1338	2745
Optimal bandwidth ( $\pm$ days)	108	109	211

Regression coefficients from local linear regression shown with robust standard errors (clustered by mother) in parentheses. The estimation samples are determined by an adaptive mean-squared error optimal bandwidth selection. All models include the distance variable and its interaction with the DACA eligibility indicator. The outcome variables are coded as 0 or 100 such that the effect estimates of the regression coefficients are measured in percentage points. See text for details.

**Table S.7: Regression Discontinuity Design Estimates: Effect of Mothers' DACA Eligibility on Children's Mental Health (Bias-Corrected Local Polynomial Estimator)**

Outcome	Adjustment or Anxiety Disorder	Adjustment Disorder	Anxiety Disorder
Model	(1)	(2)	(3)
Effect of Mothers' DACA Eligibility	-5.54 ( 2.33)	-5.04 ( 2.21)	-2.32 ( 1.45)
Number of children	3039	2741	2002
Optimal bandwidth ( $\pm$ days)	199	180	132

Regression coefficients from bias-corrected local polynomial estimator shown with robust standard errors (clustered by mother) in parentheses. The estimation samples are determined by an adaptive mean-squared error optimal bandwidth selection. The outcome variables are coded as 0 or 100 such that the effect estimates of the regression coefficients are measured in percentage points. See text for details.

**Table S.8: Regression Discontinuity Design Estimates: Effect of Mothers' DACA Eligibility on Children's Mental Health (Children Born Before DACA)**

Outcome	Adjustment or Anxiety Disorder	Adjustment Disorder	Anxiety Disorder
Model	(1)	(2)	(3)
Effect of Mothers' DACA Eligibility	-5.32 ( 2.12)	-4.78 ( 1.96)	-1.98 ( 1.36)
Number of children	2663	2456	1800
Optimal bandwidth ( $\pm$ days)	199	184	136
Percent change ( $100 \left(\frac{\hat{\tau}}{\hat{\alpha}}\right)$ )	-58.39	-65.30	-68.35

Regression coefficients from local linear regression shown with robust standard errors (clustered by mother) in parentheses. The estimation samples are determined by an adaptive mean-squared error optimal bandwidth selection. All models include the distance variable and its interaction with the DACA eligibility indicator. The outcome variables are coded as 0 or 100 such that the effect estimates of the regression coefficients are measured in percentage points. The percent change in the last row is computed as  $100 \left(\frac{\hat{\tau}}{\hat{\alpha}}\right)$  and measures at the DACA birthdate cutoff the effect of mothers' DACA eligibility ( $\hat{\tau}$ ) divided by the estimated average diagnoses rate for children of ineligible mothers ( $\hat{\alpha}$ ). See text for details.

**Table S.9: Regression Discontinuity Design Estimates: Effect of Mothers' DACA Eligibility on Children's Mental Health (Post-DACA Period Including Q3 and Q4 of 2012)**

Outcome	Adjustment or Anxiety Disorder	Adjustment Disorder	Anxiety Disorder
Model	(1)	(2)	(3)
Effect of Mothers' DACA Eligibility	-6.13 ( 2.32)	-5.27 ( 2.14)	-2.21 ( 1.40)
Number of children	2355	2132	1776
Optimal bandwidth ( $\pm$ days)	177	161	133
Percent change ( $100 \left(\frac{\hat{\tau}}{\hat{\alpha}}\right)$ )	-60.12	-62.68	-72.56

Regression coefficients from local linear regression shown with robust standard errors (clustered by mother) in parentheses. The estimation samples are determined by an adaptive mean-squared error optimal bandwidth selection. All models include the distance variable and its interaction with the DACA eligibility indicator. The outcome variables are coded as 0 or 100 such that the effect estimates of the regression coefficients are measured in percentage points. The percent change in the last row is computed as  $100 \left(\frac{\hat{\tau}}{\hat{\alpha}}\right)$  and measures at the DACA birthdate cutoff the effect of mothers' DACA eligibility ( $\hat{\tau}$ ) divided by the estimated average diagnoses rate for children of ineligible mothers ( $\hat{\alpha}$ ). See text for details.

**Table S.10: Regression Discontinuity Design Estimates: Effect of Mothers' DACA Eligibility on Children's Mental Health (Alternative Definitions of Mental Health Outcomes)**

Outcome	Adjustment or Acute Stress Disorder	Adjustment Disorder	Anxiety Disorder
Model	(1)	(2)	(3)
Effect of Mothers' DACA Eligibility	-5.99 ( 1.91)	-4.68 ( 1.61)	-0.77 ( 1.33)
Number of children	2240	2156	1864
Optimal bandwidth ( $\pm$ days)	167	162	140
Percent change ( $100 \left(\frac{\hat{\tau}}{\hat{\alpha}}\right)$ )	-79.14	-81.69	-38.99

Regression coefficients from local linear regression shown with robust standard errors (clustered by mother) in parentheses. The estimation samples are determined by an adaptive mean-squared error optimal bandwidth selection. All models include the distance variable and its interaction with the DACA eligibility indicator. The outcome variables are coded as 0 or 100 such that the effect estimates of the regression coefficients are measured in percentage points. The percent change in the last row is computed as  $100 \left(\frac{\hat{\tau}}{\hat{\alpha}}\right)$  and measures at the DACA birthdate cutoff the effect of mothers' DACA eligibility ( $\hat{\tau}$ ) divided by the estimated average diagnoses rate for children of ineligible mothers ( $\hat{\alpha}$ ). See text for details.

**Table S.11: Regression Discontinuity Design Estimates: Effect of Mothers' DACA Eligibility on Children's Mental Health (Children Age 0-5)**

Outcome	Adjustment or Anxiety Disorder	Adjustment Disorder	Anxiety Disorder
Model	(1)	(2)	(3)
Effect of Mothers' DACA Eligibility	-2.69 ( 2.46)	-1.99 ( 2.23)	-0.07 ( 0.98)
Number of children	1114	1198	962
Optimal bandwidth ( $\pm$ days)	205	221	182
Percent change ( $100 \left(\frac{\hat{\tau}}{\hat{\alpha}}\right)$ )	-50.75	-46.67	-13.32

Regression coefficients from local linear regression shown with robust standard errors (clustered by mother) in parentheses. The estimation samples are determined by an adaptive mean-squared error optimal bandwidth selection. All models include the distance variable and its interaction with the DACA eligibility indicator. The outcome variables are coded as 0 or 100 such that the effect estimates of the regression coefficients are measured in percentage points. The percent change in the last row is computed as  $100 \left(\frac{\hat{\tau}}{\hat{\alpha}}\right)$  and measures at the DACA birthdate cutoff the effect of mothers' DACA eligibility ( $\hat{\tau}$ ) divided by the estimated average diagnoses rate for children of ineligible mothers ( $\hat{\alpha}$ ). See text for details.

**Table S.12: Regression Discontinuity Design Estimates: Effect of Mothers' DACA Eligibility on Children's Mental Health (Children Age 6-12)**

Outcome	Adjustment or Anxiety Disorder	Adjustment Disorder	Anxiety Disorder
Model	(1)	(2)	(3)
Effect of Mothers' DACA Eligibility	-4.98 ( 2.57)	-5.69 ( 2.33)	-1.62 ( 1.67)
Number of children	1870	1793	1417
Optimal bandwidth ( $\pm$ days)	187	179	143
Percent change ( $100 \left(\frac{\hat{\tau}}{\hat{\alpha}}\right)$ )	-53.21	-72.43	-49.45

Regression coefficients from local linear regression shown with robust standard errors (clustered by mother) in parentheses. The estimation samples are determined by an adaptive mean-squared error optimal bandwidth selection. All models include the distance variable and its interaction with the DACA eligibility indicator. The outcome variables are coded as 0 or 100 such that the effect estimates of the regression coefficients are measured in percentage points. The percent change in the last row is computed as  $100 \left(\frac{\hat{\tau}}{\hat{\alpha}}\right)$  and measures at the DACA birthdate cutoff the effect of mothers' DACA eligibility ( $\hat{\tau}$ ) divided by the estimated average diagnoses rate for children of ineligible mothers ( $\hat{\alpha}$ ). See text for details.

**Table S.13: Regression Discontinuity Design Estimates: Effect of Mothers' DACA Eligibility on Children's Mental Health (Males)**

Outcome	Adjustment or Anxiety Disorder	Adjustment Disorder	Anxiety Disorder
Model	(1)	(2)	(3)
Effect of Mothers' DACA Eligibility	-5.14 ( 2.58)	-7.11 ( 2.47)	0.23 ( 1.21)
Number of children	1418	1295	1031
Optimal bandwidth ( $\pm$ days)	185	171	139
Percent change ( $100 \left(\frac{\hat{\tau}}{\hat{\alpha}}\right)$ )	-69.40	-90.35	36.82

Regression coefficients from local linear regression shown with robust standard errors (clustered by mother) in parentheses. The estimation samples are determined by an adaptive mean-squared error optimal bandwidth selection. All models include the distance variable and its interaction with the DACA eligibility indicator. The outcome variables are coded as 0 or 100 such that the effect estimates of the regression coefficients are measured in percentage points. The percent change in the last row is computed as  $100 \left(\frac{\hat{\tau}}{\hat{\alpha}}\right)$  and measures at the DACA birthdate cutoff the effect of mothers' DACA eligibility ( $\hat{\tau}$ ) divided by the estimated average diagnoses rate for children of ineligible mothers ( $\hat{\alpha}$ ). See text for details.

**Table S.14: Regression Discontinuity Design Estimates: Effect of Mothers' DACA Eligibility on Children's Mental Health (Females)**

Outcome	Adjustment or Anxiety Disorder	Adjustment Disorder	Anxiety Disorder
Model	(1)	(2)	(3)
Effect of Mothers'	-3.38	-1.58	-2.07
DACA Eligibility	( 2.67)	( 2.29)	( 1.55)
Number of children	1453	1516	1610
Optimal bandwidth ( $\pm$ days)	189	197	205
Percent change ( $100 \left(\frac{\hat{\tau}}{\hat{\alpha}}\right)$ )	-39.61	-28.19	-56.64

Regression coefficients from local linear regression shown with robust standard errors (clustered by mother) in parentheses. The estimation samples are determined by an adaptive mean-squared error optimal bandwidth selection. All models include the distance variable and its interaction with the DACA eligibility indicator. The outcome variables are coded as 0 or 100 such that the effect estimates of the regression coefficients are measured in percentage points. The percent change in the last row is computed as  $100 \left(\frac{\hat{\tau}}{\hat{\alpha}}\right)$  and measures at the DACA birthdate cutoff the effect of mothers' DACA eligibility ( $\hat{\tau}$ ) divided by the estimated average diagnoses rate for children of ineligible mothers ( $\hat{\alpha}$ ). See text for details.

**Table S.15: Regression Discontinuity Design Estimates: Effect of Medicaid Mothers' Post-Cutoff Birthdates on Children's Mental Health**

Outcome	Adjustment or Anxiety Disorder	Adjustment Disorder	Anxiety Disorder
Model	(1)	(2)	(3)
Effect of Mothers'	0.55	1.10	0.18
Post-Cutoff Birthdates	( 1.11)	( 1.07)	( 0.63)
Number of children	10444	9753	8681
Optimal bandwidth ( $\pm$ days)	216	202	179

Regression coefficients from local linear regression shown with robust standard errors (clustered by mother) in parentheses. The estimation samples are determined by an adaptive mean-squared error optimal bandwidth selection. All models include the distance variable and its interaction with the DACA eligibility indicator. The outcome variables are coded as 0 or 100 such that the effect estimates of the regression coefficients are measured in percentage points. See text for details.



**Table S.16: Regression Discontinuity Design Estimates: Effect of Mother’s DACA Eligibility on Children’s Health Care Utilization**

Outcome	No. of Outpatient Visits	No. of ER Visits	No. of Total Visits
Model	(1)	(2)	(3)
Effect of Mothers’ DACA Eligibility	0.03 ( 0.95)	-0.05 ( 0.14)	-0.32 ( 1.06)
Number of children	2379	2079	2121
Optimal bandwidth ( $\pm$ days)	156	138	140

Regression coefficients from local linear regression shown with robust standard errors (clustered by mother) in parentheses. The estimation samples are determined by an adaptive mean-squared error optimal bandwidth selection. All models include the distance variable and its interaction with the DACA eligibility indicator. ER-Emergency room. ER visits include visits to urgent care. See text for details.

**Table S.17: Regression Discontinuity Design Estimates: Effect of Mothers’ DACA Eligibility on Children’s Mental Health (Children With at Least One Health Care Visit Post-DACA Period)**

Outcome	Adjustment or Anxiety Disorder	Adjustment Disorder	Anxiety Disorder
Model	(1)	(2)	(3)
Effect of Mothers’ DACA Eligibility	-5.91 ( 2.45)	-6.77 ( 2.40)	0.23 ( 1.27)
Number of children	1565	1384	987
Optimal bandwidth ( $\pm$ days)	202	182	133
Percent change ( $100 \left(\frac{\hat{\tau}}{\hat{\alpha}}\right)$ )	-76.11	-90.46	54.19

Regression coefficients from local linear regression shown with robust standard errors (clustered by mother) in parentheses. The estimation samples are determined by an adaptive mean-squared error optimal bandwidth selection. All models include the distance variable and its interaction with the DACA eligibility indicator. The outcome variables are coded as 0 or 100 such that the effect estimates of the regression coefficients are measured in percentage points. The percent change in the last row is computed as  $100 \left(\frac{\hat{\tau}}{\hat{\alpha}}\right)$  and measures at the DACA birthdate cutoff the effect of mothers’ DACA eligibility ( $\hat{\tau}$ ) divided by the estimated average diagnoses rate for children of ineligible mothers ( $\hat{\alpha}$ ). See text for details.

# Figures

Fig. S.1: **Number of DACA Applications.** Shows the cumulative number of DACA applications approved by the United States Citizenship and Immigration Service (USCIS). Source: (19).

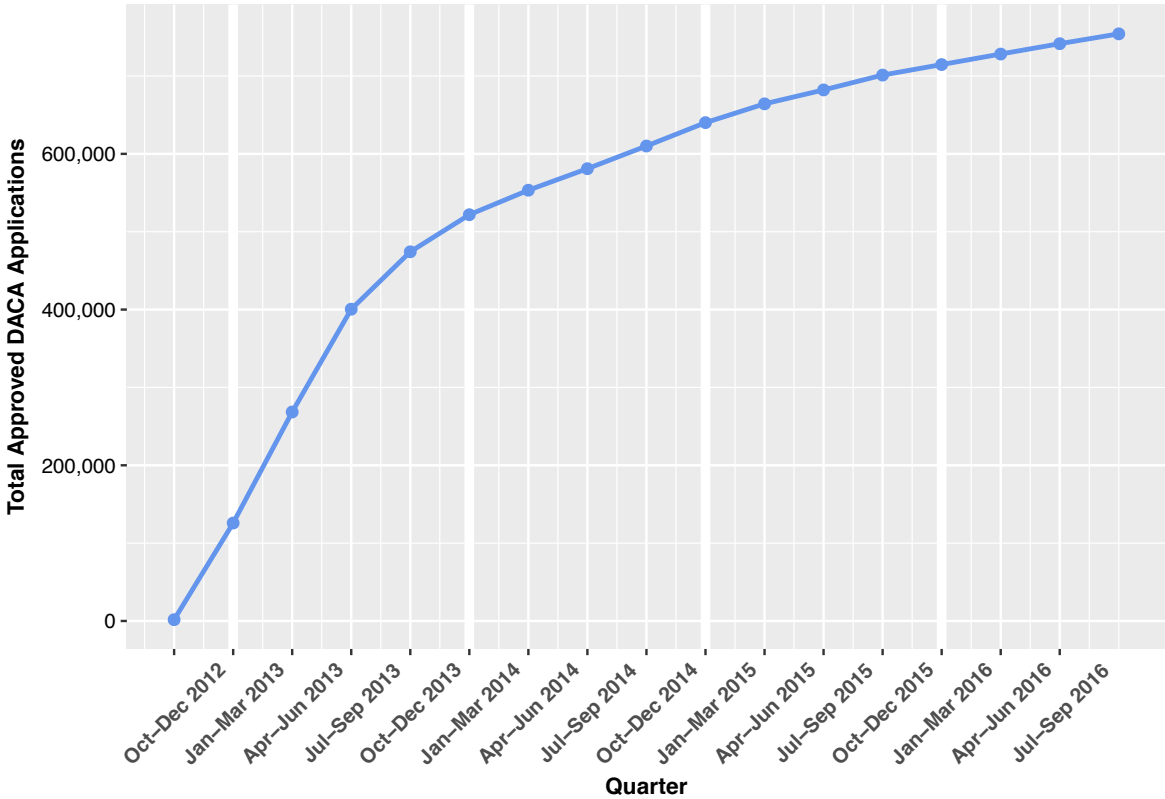


Fig. S.2: **Test for Sorting Around the Birthdate Cutoff.** Shows estimated densities of the distribution of mothers' birthdates on both sides of the June 15th, 1981 birthdate cutoff that determined DACA eligibility. Consistent with the no-sorting assumption of the RD design there was no discernible discontinuity at the cutoff date.

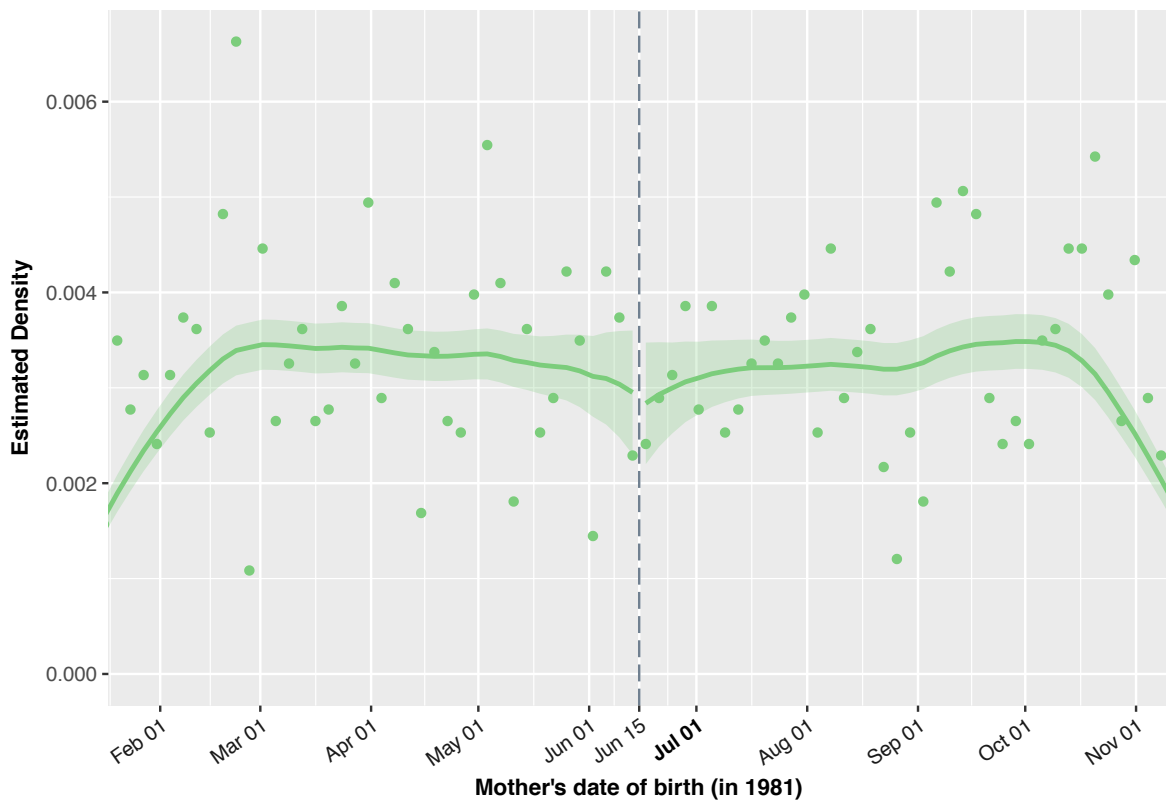
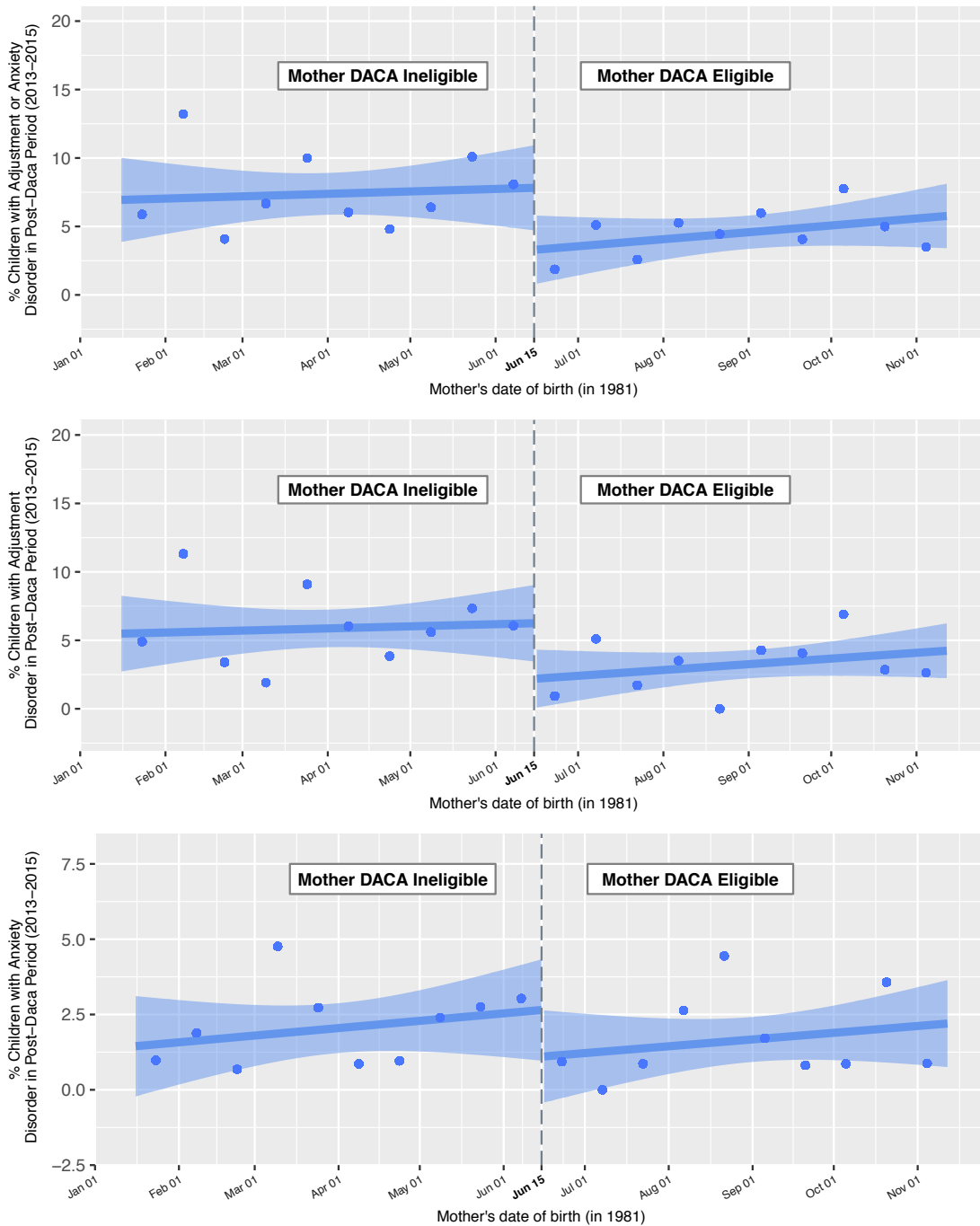
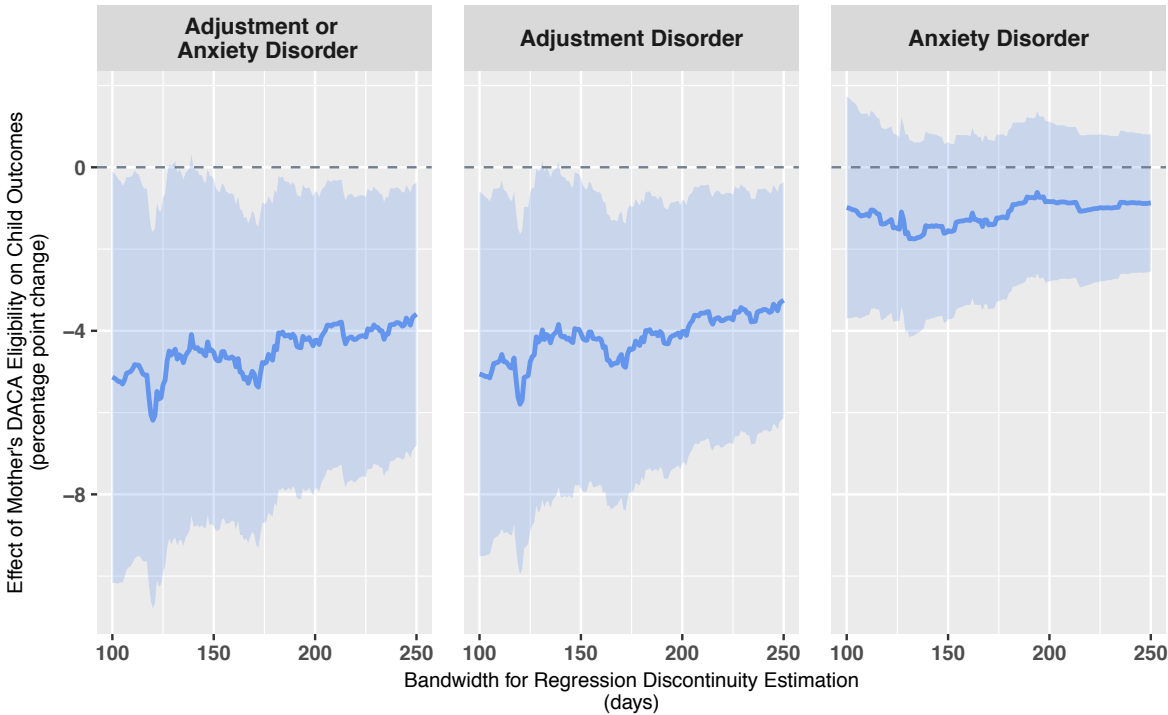


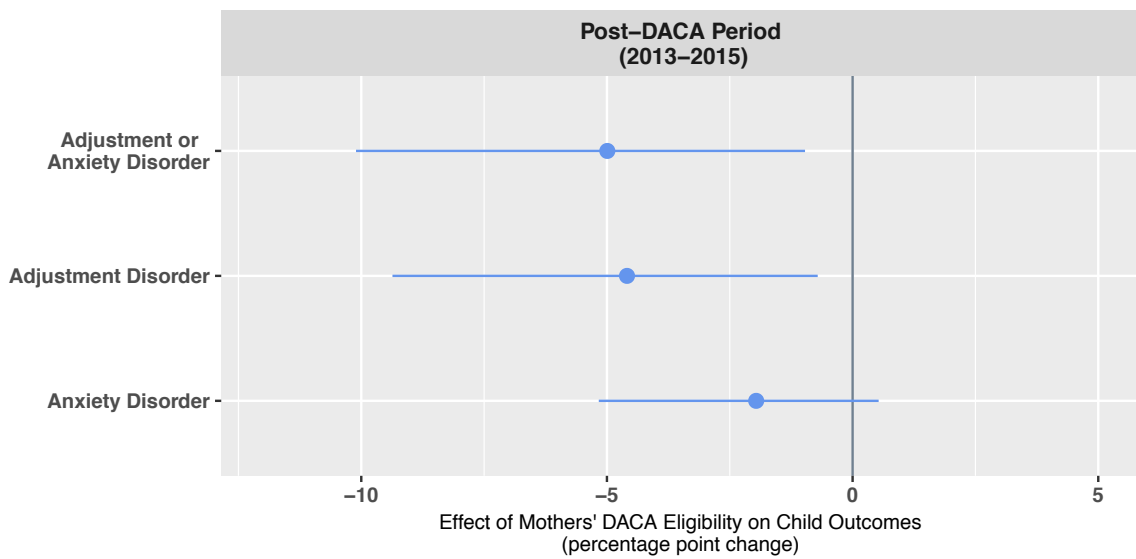
Fig. S.3: **Regression Discontinuity Design Plots for the Effects of Mothers' DACA Eligibility on their Children's Mental Health.** Blue lines are average diagnoses rates with 95% confidence bands from local linear regressions fitted to the trimmed samples within a bandwidth of  $\pm 150$  days around the DACA birthdate eligibility cutoff. Blue dots are average diagnoses rates for each 15 day birthdate interval.



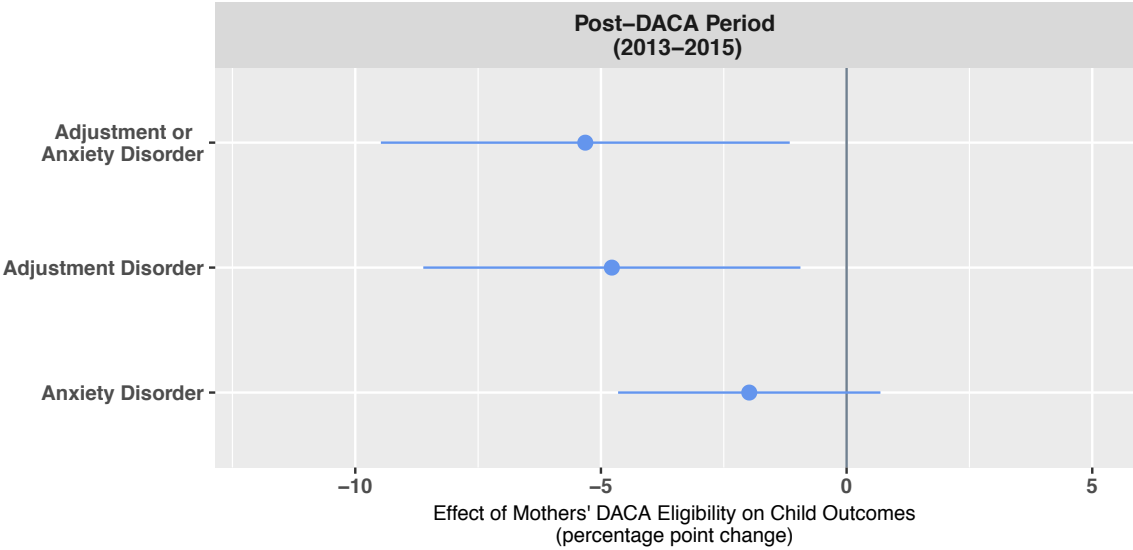
**Fig. S.4: Effect of Mothers' DACA Eligibility on Children's Mental Health.** Shows the effect estimates and 95% confidence intervals from the RD model with varying bandwidths. The effect estimates were stable when varying the bandwidth around the optimal bandwidth.



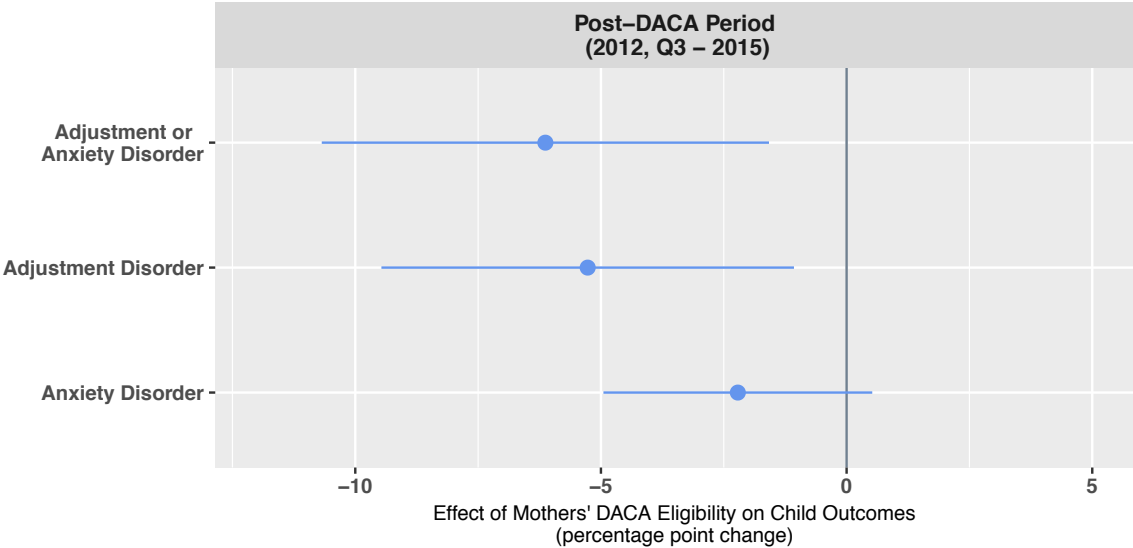
**Fig. S.5: Effect of Mothers' DACA Eligibility on Children's Mental Health Outcomes (Bias-Corrected Local Polynomial Estimator).** Shows effect estimates and 95% confidence intervals from the bias-corrected local polynomial estimator for the RD design. The effects of DACA eligibility were similar to the estimates from the benchmark model.



**Fig. S.6: Effect of Mothers' DACA Eligibility on Children's Mental Health (Children Born Before DACA).** Shows effect estimates and 95% confidence intervals from the RD design. The effects of DACA eligibility were similar to the benchmark model when we excluded children who were born in the post-DACA period.

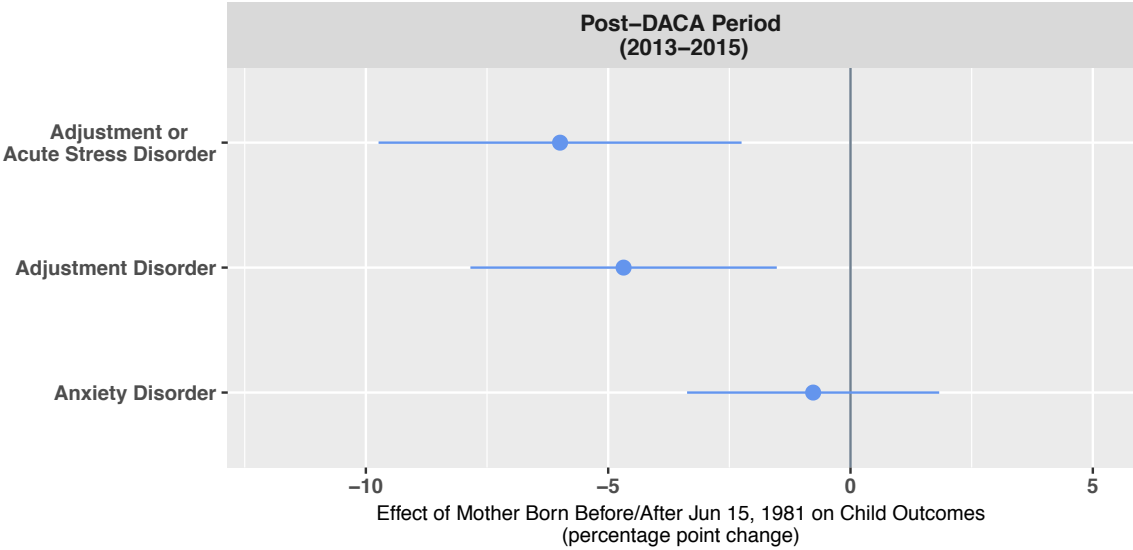


**Fig. S.7: Effect of Mothers' DACA Eligibility on Children's Mental Health (post-DACA Period Including Q3 and Q4 2012).** Shows effect estimates and 95% confidence intervals from the RD design. The effects of DACA eligibility were similar to the benchmark model when we included in the post-DACA period diagnoses that occurred in quarters 3 and 4 of 2012.

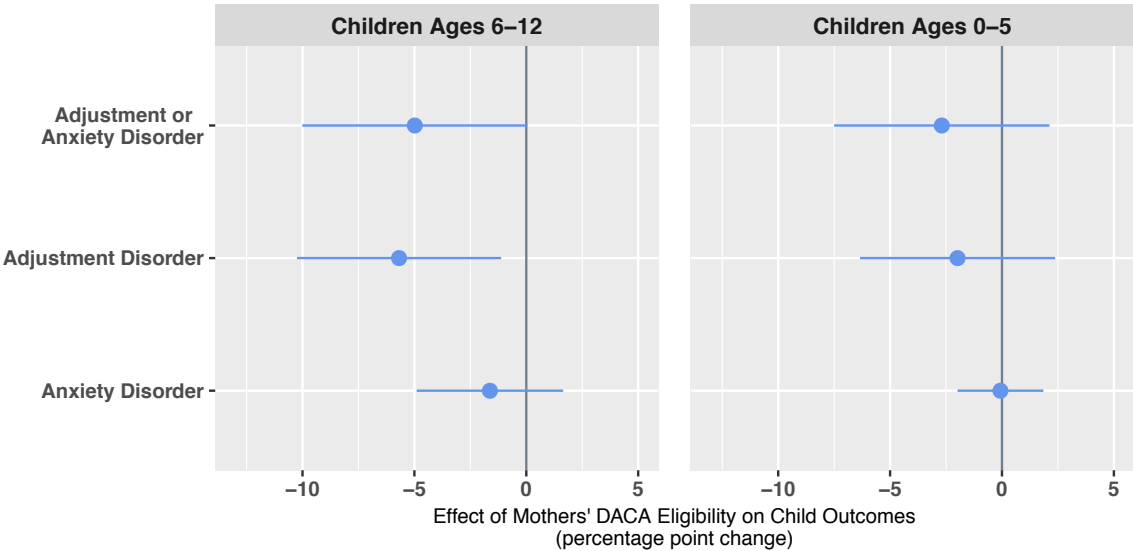




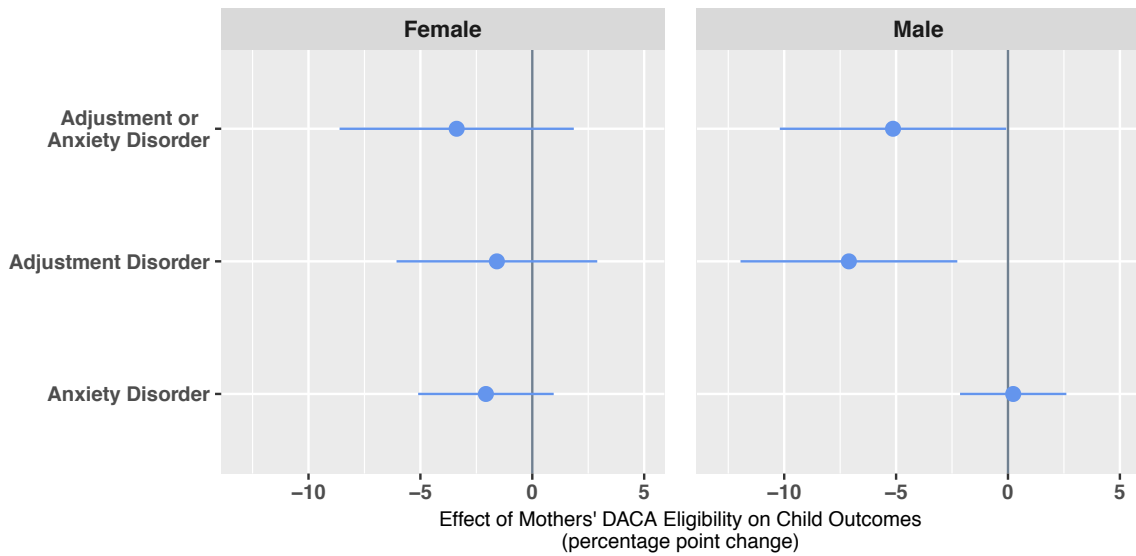
**Fig. S.8: Effect of Mothers' DACA Eligibility on Children's Mental Health (Alternative Definitions of Mental Health Outcomes).** Shows effect estimates and 95% confidence intervals from the RD design. The effects of DACA eligibility were similar to the benchmark model when we used alternative definitions of the mental health outcomes based on the Diagnostic and Statistical Manual of Mental Disorders.



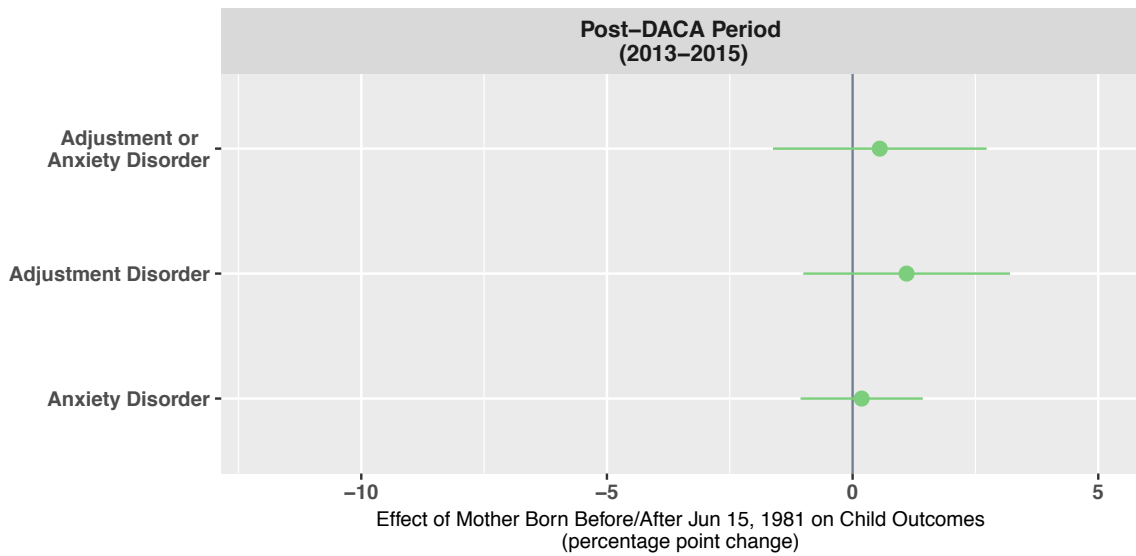
**Fig. S.9: Effect of Mothers' DACA Eligibility on Children's Mental Health by Child Age**  
 Shows the effect estimates and 95% confidence intervals from the RD design for separate age groups. The effect of mother's DACA eligibility was concentrated among children between ages 6-12 (in 2015).



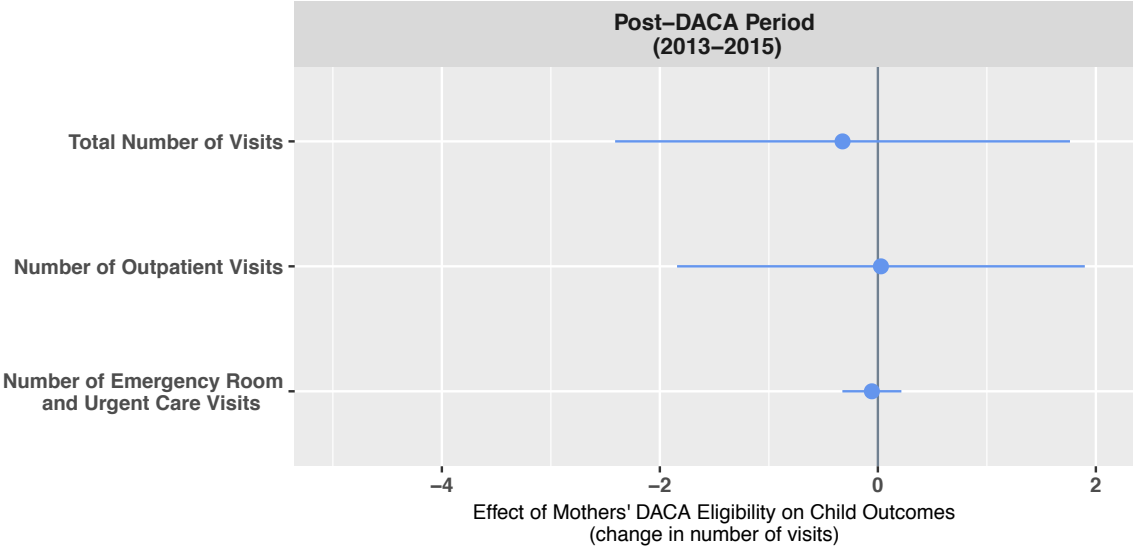
**Fig. S.10: Effect of Mothers' DACA Eligibility on Children's Mental Health by Child Gender** Shows the effect estimates and 95% confidence intervals from the RD design for females and males. The effect of mother's DACA eligibility on adjustment disorders was slightly more pronounced among male children but the difference was not statistically significant.



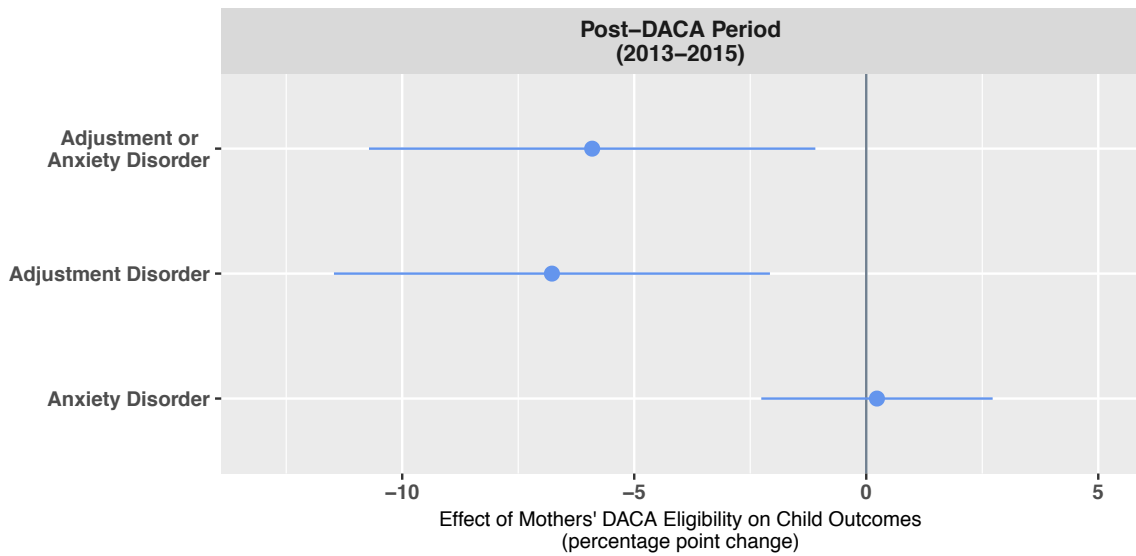
**Fig. S.11: Effect of Medicaid Mothers' Post-Cutoff Birthdates on Children's Mental Health.** Shows effect estimates and 95% confidence intervals from the benchmark RD design. Having a mother who utilized standard medicaid for their pregnancy, and is born after the June 15th, 1981 birthdate cutoff, had no discernible effect on their children's mental health outcomes. These mothers are not affected by DACA.



**Fig. S.12: Effect of Mothers' DACA Eligibility on Children's Health Care Utilization.** Shows effect estimates and 95% confidence intervals from the RD design. DACA eligibility of unauthorized mothers had no discernible effect on the health care utilization of the children in the post-DACA period.



**Fig. S.13: Effect of Mothers' DACA Eligibility on Children's Mental Health (Children with at Least One Health Care Visit in Post-DACA Period).** Shows effect estimates and 95% confidence intervals from the RD design. The effects of DACA eligibility were similar to the benchmark model when we restricted the sample to children who has at least one health care visit in the post-DACA period.



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**Pre-Analysis Plan:  
The Effect of Deferred Action on the Mental Health of Children of Undocumented  
Immigrants**

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## **Project Goal**

Does providing undocumented immigrants with temporary legal status improve health outcomes for immigrant families? President Obama's executive action announced on June 15, 2012 pertains to Deferred Action for Childhood Arrivals (DACA), and presents a unique opportunity to assess this important question. As part of a larger research project funded by the Russell Sage Foundation in this study we will investigate the effect of DACA eligibility of undocumented mothers on the mental health outcomes of their children.

## **Methods and Data**

We will use medical claims data from January 1, 2003 through October 1, 2015 that we are in the process of obtaining from the Oregon Health Authority's Department of Health Analytics for all Medicaid claims, encompassing full scope Medicaid as well as Emergency Medicaid (CAWEM) and Emergency Medicaid Plus (CAWEM Plus). The latter two programs are overwhelmingly used by undocumented immigrant mothers because they cover labor and delivery regardless of legal status. We will use these two programs to proxy for undocumented status.<sup>1</sup> Using this data, we plan to identify reproductive aged women (ages 12-51) and all their children born during this period. We will then trim the sample to the target sample that consists of the children of those mothers who are born between January 1<sup>st</sup> 1980 and December 31<sup>st</sup> 1982. Those birth dates are chosen in order to exploit the age eligibility requirements of DACA for causal identification. The eligibility criteria state that undocumented immigrants had to be under the age of 31 as of June 15, 2012 in order to be eligible for DACA. That means that among the undocumented women in our data, those who are born on or after June 16<sup>th</sup> are likely eligible while those who are born before that date are not eligible and our sample is trimmed to birthdates within 1.5 years on both sides of the date of birth cutpoint.

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<sup>1</sup> For instance in North Carolina, researchers found that over a four-year period 99% of Emergency Medicaid patients were undocumented immigrants (DuBard and Massing 2007). In California in 2011 there were 73,000 births to undocumented women in hospital settings and almost 500,000 undocumented women of reproductive age (15-44) in the Medi-Cal system (Watkins 2014).

We will then estimate the effect of DACA eligibility of the mother on the mental health outcomes for the kids using a regression discontinuity design. We will use the following linear estimating equation:

$$y_i = \alpha + \beta Z_i + \gamma D_i + \delta(Z_i D_i) + \varepsilon_i$$

where the unit of analysis are children in the target sample (i.e., born to undocumented mothers who have birth dates between between January 1<sup>st</sup> 1980 and December 31<sup>st</sup> 1982);  $y_i$  is the health outcome for child  $i$  (measured in the post DACA period starting 2013),  $D_i$  is the treatment variable coded 1 if the mother of child  $i$  was born after the cutpoint and therefore likely DACA eligible or zero otherwise,  $Z_i$  is the running variable that measures the number of days by which the mother of child  $i$  made or missed the date of birth cutpoint. In this regression  $\gamma$  will identify the effect of DACA eligibility on the mental health of children comparing mothers who just made or missed the cutpoint. We will also investigate whether the results are sensitive to including children who are born after DACA started, which is potentially post-treatment.

We will use the default settings in the Stata/R package ‘RDrobust’ for bandwidth selection that uses the bandwidth selection algorithm describe in Calonico, Cattaneo, and Titiunik (2014) and also check the sensitivity of the estimates in the neighborhood around the optimal bandwidth chosen by the algorithm. In addition to this model we will run a variety of standard RDD checks such as placebo checks for looking at whether we find similar effects among the Medicaid population who are not undocumented immigrants and balance checks for pre-existing covariates (see Imbens and Lemieux 2008).

The key outcome of interest is whether children during the 2013-2015 period had a diagnosis of an adjustment disorder (ICD-9 category 309), acute reaction to stress (ICD-9 category 308), or anxiety, dissociative and somatoform disorders (ICD-9 category 300). We will create a summary outcome measure using all three ICD-9 categories coded 1 if a child is diagnosed with any of the three mental health disorders/reactions, 0 if not. All three of these are relevant for kids and are thought to be at least partly attributable to an external stressor. Among these we are particularly, interested in adjustment disorders (309 and 308 which is often considered a pre-cursor to 309)

since these are a function of a child's response to some well identified external stressor (such as an exogenous event of family separation, arrest, etc.) and therefore highly applicable to a change in a parent's immigration status. We will also consider effects on 300 where environmental factors could play a significant role, but an external stressor is often not identified.

It is plausible that DACA could affect adjustment disorders among children of undocumented mothers in a number of ways. For example, it may significantly reduce the stress and anxiety of children because they no longer fear their parent's deportation or removal. Alternatively, if parents who obtain temporary legal status (deferred action) are more likely to take their children to the doctor (increased health care utilization), we could plausibly expect detection of adjustment disorders to go up. Therefore, we will also examine if DACA eligibility impacts children's health care utilization (e.g., outpatient visits).

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